THE NAVAL SAFETY CENTER'S AVIATION MAGAZINE

approach

June 2002

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The Naval Safety Center's Aviation Magazine

June 2002 Volume 47 No. 6
On the Cover An FA-18 attached to VFA-27 and an F-14 attached to VF-154 operating over the Sea of Japan. Photo by PH3 Alex C. Witte.

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Mission Statement

Mishaps waste our time and resources. They take our Sailors, Marines and civilian employees away from their units and workplaces and put them in hospitals, wheelchairs and coffins. Mishaps ruin equipment and weapons. They diminish our readiness.

This magazine's goal is to help make sure that personnel can devote their time and energy to the mission, and that any losses are due to enemy action, not to our own errors, shortcuts or failure to manage risk.

We believe there is only one way to do any task: the way that follows the rules and takes precautions against hazards. Combat is hazardous enough; the time to learn to do a job right is before combat starts.

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Postmaster: Send address changes to Approach, Code 73A
Naval Safety Center, 375 A Street
Norfolk, VA 23511-4399

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Features

June Thanks

Thanks for helping with this issue...

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Ltjg. Timothy Dinsmore, HSL-47
Lt. Patrick Hanrahan, HSL-37
LCdr. Stan Jones, VFA-147
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Photo by Hisashi Fujimoto

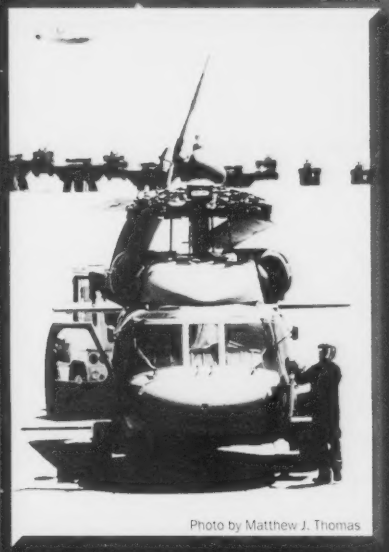
Photo by Matthew J. Thomas

Photo by PH3 Alex C. Witte

Departments

Worst-Case

By Derek Nelson

Shirley Temple sang a song called "Be Optimistic," but I don't think the average aviator was her target audience. Aviation often demands the opposite attitude.

Put yourself in the following situation. The location: the Bahamas. The weather: sunny, 90 degrees, clear skies. You're flying a Black Hawk helicopter on a post-maintenance check flight. You and your copilot want to take your wives for a quick spin around the island. You want to show them why you love flying helicopters, and this looks like a rare chance. Yes, you'll be breaking the rules (a two-star has to approve civilian passengers), but the local powers-that-be seem lax. There's an abandoned runway near the hangars. You and an aircrew member can take off and check the repairs. You can use the old runway to pick up the wives and drop them off after the tour, then return to base.

Here's the best case: a smooth flight, beautiful views of the gorgeous Caribbean. The wives get a taste of how much fun it is to fly; they ooh and ah. You drop them off, and you don't get caught. Here's the worst case: something goes wrong. You and the other pilot each have two children. You're just two years away from retirement. So what you say? Would you be optimistic or pessimistic?

Several years ago, two Army chief warrant officers counted on the best-case scenario. They seized the opportunity described above, and everything went fine until the helicopter neared the runway at the end of the flight. A couple of soldiers standing behind the hangar saw the helo's tail snap to the right and heard a loud whine. The helo shuddered, pitched nose up, rolled left, and plunged into the jungle, 700 yards away.

Losing control and slamming into the trees happened in a blur. The aftermath was excruciatingly opposite. The copilot came to, heard the pilot screaming, and fought his way out of the cockpit through branches and vines. His right arm was broken. Crumpled metal pinned his wife inside. The acting crew chief was trapped against the helo's ceiling by his seat (he had a broken nose, and his right leg almost had been amputated).

A rescue helo had to land at the abandoned runway. The rescue team battled its way through dense undergrowth to reach the site. The first rescuer who saw the bodies of the two women immediately–and correctly–assumed they were dead. Gradually, police, medics and a minister showed up. Someone called for a Coast Guard rescue helicopter from Nassau, which arrived and lowered a basket to the crash site for one of the survivors. It took four hours to get the bodies of the wives out of the wreckage.

The worst thing imaginable had happened, but the emotional and legal ordeal was just beginning. The two pilots had to tell the parents and the children. They faced a total of 37 disciplinary and legal charges, including involuntary manslaughter, wrongful appropriation of a military aircraft, and destruction of government property (most charges were dropped later , but the prospect of prison was real).

Scenario

At the ensuing court-martial, witnesses reported seeing helo pilots in the Bahamas perform illegal maneuvers without being counseled or punished. One person pointed out a common syndrome: Other pilots see one of their peers do an illegal maneuver and think it's OK, then they push the envelope a little more. Soon, an unspoken competition is underway.

What caused the mishap? The collateral investigation found no mechanical problems, which left pilot error as the culprit. Serious hazards develop when a pilot banks his helo 100 feet above the trees on a hot day at a high-density altitude. The simplest is that the demand on the helo exceeds the power available. Banking at 30 degrees requires 15 percent more power; at 60 degrees, you need 100 percent more. A Black Hawk on an 86-degree day, weighing 20,000 pounds at a density altitude of 0 will stall at around 52 degrees of bank. The two pilots had a combined 2,700 hours of flight time; they didn't need a refresher in aerodynamics.

This horror story draws together lots of elements besides physics and in-flight pilot error: headwork; accountability and enforcing regulations; and flathatting, which certainly isn't just an Army problem. Through the years, naval aviators have taken a back seat to no one when it comes to unauthorized maneuvers.

One thing is clear: Nobody should need a twisted-metal-and-shattered-canopy reminder of why we have rules. For that matter, they shouldn't need a nosy boss to make them follow the rules, either. As soon as they have some responsibility, it ought to be second nature.

Optimism is a fine thing, and Shirley Temple's song was cute and cheerful. On the links or in a pub, we all prefer upbeat people. When you sign for an aircraft, however, a little pessimism will go a long way toward keeping that grin on your face while you're flying and after you land.

Worst-Case

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Hey Boss, Are My

By Lt. Matthew Hartkop

Nothing out of the ordinary after more than three weeks of JTFEX and as we neared the end of work-ups. Even a multi-plane, force-concentration-training strike on a moonless night seemed standard. During the past eight months, we had briefed and flown dozens of similar training missions. The brief went quickly, giving us a few minutes to grab a bite to eat before flying.

"Should be a nice night to fly," I thought as I glanced up from inside the jet at the clear, moonless sky. Everything from preflight to final checks went smoothly. As always, I used the time between final checkers and taxi to scan everything in the cockpit and make sure I was ready to fly. Part of this scan always included going through my takeoff checklist from bottom to top.

It was to be a typical no-horizon, night cat shot. Before taxiing to the JBD, I made sure my takeoff checklist was complete, except the controls wipeout. I taxied to the shuttle, rogered the weight board, and armed up. The yellowshirt gave the tension signal. I began to go through

I quickly scanned the HUD and noted the airspeed was greater than 100 knots.

Lights On?

my checks, "Controls—free and correct. Flaps—whooaaaaa!"

As I looked down to double-check the flaps, they were set to one-half, my head was slammed against my left shoulder by the catapult firing.

My initial thought was the holdback had malfunctioned because my lights still were off, and it had been only a few seconds since I went into tension. I quickly scanned the HUD and noted the airspeed was greater than 100 knots. It felt like a good cat shot. Down the stroke, I instinctively had shoved the throttles into max AB and flew away safely, making a slightly stunned, "305 airborne?" call.

After an uneventful flight and recovery, I returned to the ready room to find a stack of messages waiting for me. The shooter, the boss, and the ship's captain had called. After I apologized for being shot with my lights off, the CO of the ship told me I had missed a golden opportunity to dump on the boss over the radio.

Only later did several more appropriate radio calls come to mind. Such as:

"Boss, 305."

"Go ahead 305."

"Are my lights on?"

"No"

"Well, then why the #$%^ am I flying?"

Or, after waiting for the call, "305, turn on your lights," responding with, "I'll turn my lights on when I'm ready to go flying!"

Later that night, I sat down with the shooters to discuss the incident. As it turns out, there was a shooter under instruction (UI) launching aircraft from cat 4. He went through all of his checks, and once his checks were complete, he immediately signaled for the deck-edge operator to launch the aircraft—without actually checking that the aircraft lights were on. The deck-edge operator failed to notice the aircraft did not have its lights on and, out of habit, launched the aircraft. Fortunately, everything worked out, and we were left with a cool video of a Hornet going down the cat at night with its lights off.

I left that meeting with the shooters confident my experience was simply a fluke, an accident that was so unlikely it never could happen again. After all, I never had heard of anyone ever being launched off the catapult before they either saluted (day) or turned their lights on (night).

Two months later, this incident had faded my memory. The sun was setting over the Mediterranean as I taxied to the catapult and completed my takeoff checks. The ordies armed me, and the yellowshirt gave the tension signal. I had advanced the throttles to military when I again felt that heart-stopping and unexpected catapult shot. Instinctively, I shoved the throttles into full AB and scanned airspeed down the cat. After safely flying away, I was at a loss for words.

Photo by PH3 J. Scott Campbell
Photo modification by Patricia Eaton

Since it was just before sunset, the old, "Hey boss, are my lights on?" wouldn't quite fit. I flew away glad to be alive but angry at having been shot again off cat 4 without signaling I was ready to go.

Once safely on deck, I tried to find out exactly what the heck was going on with the shooters and cat 4. They were waiting for me. They had realized something was wrong with the catapult and downed it immediately after my launch. They troubleshot the catapult for several hours to determine why it prematurely had fired. Finally, after we went to the ILARTS room and reviewed the tapes, we discovered what had happened. Immediately after the tension signal had been given, the deck-edge operator leaned forward and pressed the catapult-fire button!

Or, after waiting for the call, "305, turn on your lights," responding with, "I'll turn my lights on when I'm ready to go flying!"

The deck-edge operator was given the final ready signal, but the sun was at his back and washed out the final ready light. The operator then reached down with his hand to shield the light from the sun, so he could see whether the final ready light was lit. He broke his own habit pattern by moving his hand, and, instead of only shielding the light, he pushed the catapult fire button out of habit. The shooter still was giving the run-up signal and never had touched the deck to signal the deck-edge operator to fire the catapult. From his peripheral vision, the shooter noticed the aircraft being shot.

Down at mid-rats, several of us mulled over the situation and came up with some lessons learned. With so many people monitoring the launch to verify the catapult is not fired until everything and everyone (including the pilot) is ready, it is impossible for this to happen, right? Wrong.

In the first instance, the yellowshirt, the shooter, the boss, and everyone else involved in the launch, all failed to notice my lights were off and shot me anyway. The second incident shows just how one person's habit pattern being disturbed could cause a mishap. Once you are put into tension, be ready to fly—immediately! On both launches, only a few seconds had elapsed between tension and being shot off the cat.

Make sure your takeoff checklist is complete (without the wipeout) before taxiing into the shuttle. As a personal technique, I will perform that checklist after final check and ready to taxi. By doing this, you already have done the checklist at least once before getting to the shuttle. The big items that will keep you alive are: flaps-half, trim 12, 30, 30, 30, and 16-degrees nose up (or as dictated by weight and asymmetry), and radar altimeter set to 40 feet.

Use the same scan down the cat every time. Airspeed should be the first priority on the stroke. In a Hornet, airspeed with more than three digits in the HUD usually indicates a good shot. Know what a good shot feels like, but never rely on seat-of-the-pants feel alone. Your instrument scan will save your life, so trust the instruments. Too many pilots have flown into the water because of spatial disorientation caused by a night-catapult shot. If your inner ear and instruments disagree, trust the instruments, climb away safely, and then work out your vertigo.

Finally, remember that thorough and correct habit patterns, knowledge of NATOPS procedures, and total situational awareness may save your life someday.

Lt. Hartkop flies with VFA-15.

Analyst comments: A common misperception is "three digits and I'm flying"—everyone knows the Hornet cannot fly away at 100 knots, yet it appears so on every cat shot. This is because of the inherent lag in the pitot-static system. The performance charts show a 110-knot stall speed for max, and 119-knot stall speed for mil with zero bank angle (with a –402 engine, at 44,000 pounds gross weight). Be sure to check fly-away speed on every shot.

Lt. Cads Bartel is the FA-18 analyst at the Naval Safety Center.

I'm a retired USAF F-16 driver who has been reading *Approach* since the 1950s and subscribing to it for over 20 years. I thoroughly enjoy your fine magazine, but the February 2002 issue finally has moved me to ask a question that has been bothering me for quite some time. Why does it seem that Navy pilots are so reluctant to declare an emergency? This wasn't a big deal in the Air Force.

An excellent case in point was found in the February article, "Wait! SOP Says No Compound-Unrelated Emergencies." The author says, "...we really had a multi-system compound emergency, at night, with a 500-foot ceiling." The ship (an unidentified cruiser) was giving them all sorts of grief, pushing them to resume the ASW mission, apparently unaware of their true situation. But the author doesn't say they declared an emergency, which, I assume, would have gotten the ship off their back while they worked the problem.

Over the years, I have concluded that using the "E" word over the radio must be seriously frowned upon in naval aviation. In countless *Approach* articles, the pilots and aircrews did not declare it. So I'm finally asking the experts.

LtCol. Hank Kramer, USAF(Ret.)

You raise an interesting question. Are naval aviators reluctant to declare an emergency? Aircrew study the NATOPS emergency-procedures section and carry the pocket checklist on flights to assist during emergencies. The aircrew also can discuss their emergency situation with squadron reps, wing and other ship personnel. The decision to declare an "E" naturally sets a lot of wheels into motion, all with the sole intent to help the aircrew. So, why hesitate to make the call? Are LtCol. Kramer's observations valid? Send comments to: jstewart@safetycenter.navy.mil.—Ed.

Mishap-Free Milestones

VP-5 24 years (146,000 hours)

VAQ-142 5 years (7,291 hours)

VAQ-133 6 years (8,049 hours)

VP-47 29 years (176,000 hours)

HMT-302 14 years (80,000 hours)

Engine Over Af

By Lt. Paul Campagna

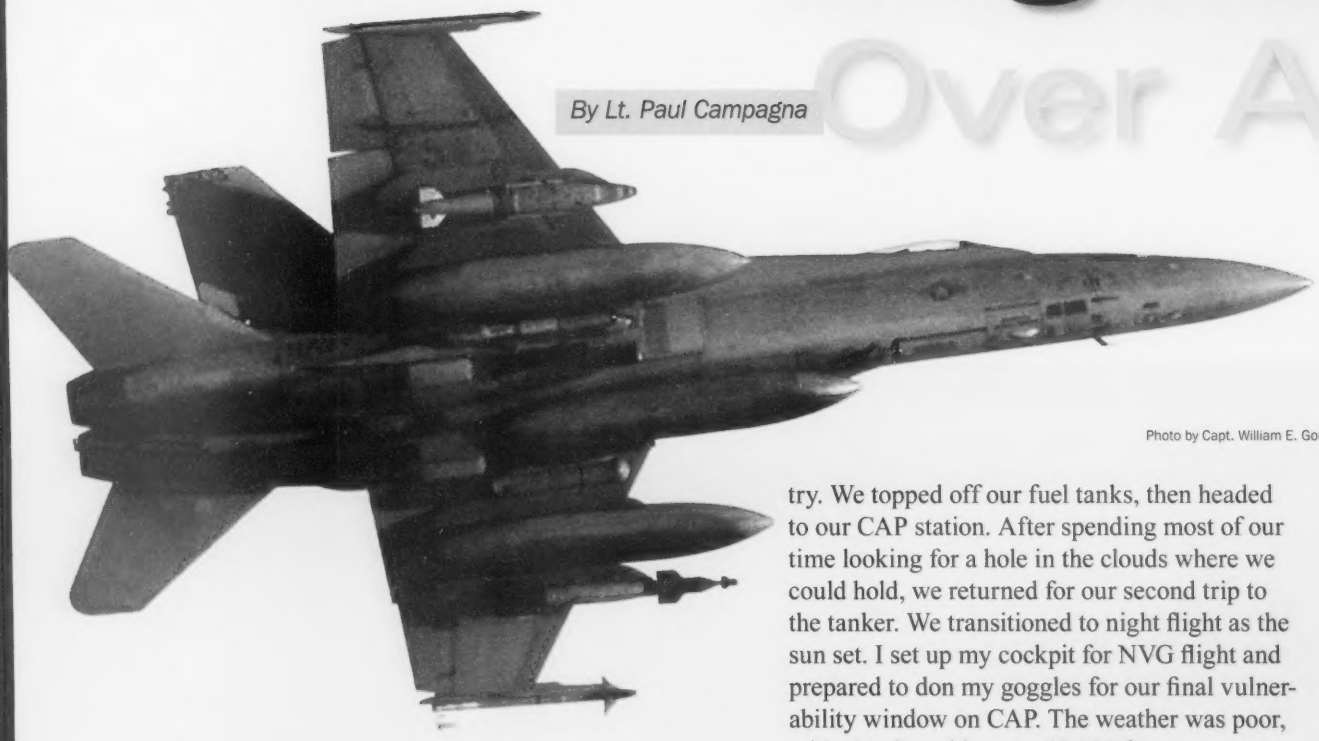


Photo by Capt. William E. Gortney

My last mission during Operation Enduring Freedom was to be on call in a CAP position in southern Afghanistan to support U.S. ground forces. The weather reported high cloud layers in the country and light turbulence at our tanking altitudes. I was loaded with 3,000 pounds of ordnance, and the mission called for a daylight launch and a night recovery.

I had hoped for an uneventful mission but instead would receive an engine caution that would remind me how a mission never is over until you are safely on deck. The command just had talked about complacency and reminded us the mission required our full attention—we should not be lax, even after more than 30 in-country missions.

Back to the beginning. The launch and rendezvous went smoothly. There were some cloud layers as we made our way across the beach, and the weather deteriorated as we entered the country. We topped off our fuel tanks, then headed to our CAP station. After spending most of our time looking for a hole in the clouds where we could hold, we returned for our second trip to the tanker. We transitioned to night flight as the sun set. I set up my cockpit for NVG flight and prepared to don my goggles for our final vulnerability window on CAP. The weather was poor, with clouds and haze to 32,000 feet.

The second tanking evolution was a little more exciting: There was more turbulence on the tanker, and we were in and out of the clouds. Our area was quiet, but we still had one more vulnerability window to cover. We started working the location of our last tanker as we got back on station and goggled up. The tanker we originally were scheduled for didn't have enough gas to top us off for our return to the ship, so we hit another tanker on the way out. By the time we got to the last tanker, they were changing altitudes and tracks to find clear areas. Unfortunately, they could not find any clear air, and, after our rendezvous, we were in a haze layer.

There was a section of aircraft in front of us, and flying form was difficult without a horizon or moon. I elected to stay on NVGs while we waited for our turn in the basket. I wondered how the last mission could be worse as I started to experience vertigo with a bad case of the leans. That's when I heard the master-caution tone and

Problems

ghanistan

saw the master-caution light.

I glanced at my display and saw an AMAD-pressure caution, which meant the gearbox powering my generator and hydraulic pump was low on oil. The procedure calls for turning off the affected generator, and securing the engine within 30 minutes.

Since it would take at least an hour to return to the ship—longer with only one engine—I would have to shut it down. The problem was I didn't have enough gas to get home and couldn't tank with only one engine. I told my wingman about the problem, and he backed me up on the procedures and quickly developed a plan. I would leave the engine on until I got a full tank, then secure it, return to the ship, and restart the engine for landing. If the engine failed before I could tank, I would have to do a single-engine approach into our divert field in Pakistan. Hoping the engine would hold out, I waited for the section on the tanker to clear, which took about 15 minutes. They were at a lower fuel state and were nearer their divert fuel state.

I made it through the tanking with no more engine problems and secured it when I was clear. The tanker slowed down and continued to drag my wingman south. I soon found out how difficult it would be to limp the aircraft home. With a full tank of gas and all my ordnance, I literally was falling out of the sky soon after going single engine. Slowing to 200 knots, I was unable to maintain FL280—where the tanker was, and descended to FL190 to hold airspeed.

My wingman got his fuel and joined me on the egress. This led to more considerations. We were unable to maintain the required corridor altitudes, so we declared an emergency. We also would not be able to make the recovery time and had to coordinate our late arrival with the ship. An ordnance-jettison area was activated in case I couldn't restart the engine.

The weather cleared once we were out of the country, and my wingman and I planned for contingencies over the radio. We eventually made it to the ship. After reviewing the procedures with the CATTC representative, I restarted the engine and made an uneventful landing.

Here are my takeaways from the experience. My wingman and I had flown together, and we were used to communicating and making decisions. He had several useful suggestions, such as activating the ordnance-jettison areas. We talked about contingencies. This helped me avoid working myself into a box I couldn't escape.

I didn't want to divert to a strange field at night with a single engine. I should have been more assertive on the radio, getting into the tanker, so I could have shut down the engine sooner. I would have lost support as I headed out on my own while my wingman tanked, but this probably was a better course of action.

Finally, the mission never is over until you are back on deck. This incident happened on the last tanking event of my last mission. We had received numerous briefs on not "dropping our packs" before we were out of the theatre, and we were just as attuned to our situation at the end of the operation as at the beginning. If I had been lax, I wouldn't have had the fuel numbers or field information on hand for a single-engine divert. Making good decisions and planning for contingencies allowed me to close out my experience in Operation Enduring Freedom on a positive note, rather than on the deck in a foreign country.

Lt. Campagna flies with VFA-97.

Flame-Throwing Prowler

Photo by Hisashi Fujimoto
Modified

By Ltjg. Van Fitzsimmons

It was a beautiful, sunny day off the coast of North Carolina. I manned up for my third front-seat Prowler flight around the boat, flying with our operations officer, a senior pilot. Also flying with us were the assistant maintenance officer and a guest flier from the ship.

We were geared up for an exciting mission in support of simulated ground troops assaulting the evil "Koronans" on the Outer Banks. We had plenty of time to test our systems since we were scheduled to be the last plane off the deck. The taxi directors on board USS *John F. Kennedy* positioned us on cat 4, and, after a final wipeout of the controls and a salute to the shooter, we were in the air. My pilot raised the gear and waited until we passed 185 knots to raise the flaps and slats. "Moving right," I said.

"Left," he replied.

I looked toward the integrated position indicator and saw the slats still indicated barber poled. The pilot momentarily pulled back on the stick and then executed a slat bunt. Generally, it is no surprise when the slats fail to indicate fully retracted; it happens routinely, and pilots instinctively correct for it. However, on this day, the slats did not retract after the slat-bunt maneuver. We put a little more altitude between the ocean

and us and tried again—nothing. I reached for the pocket checklist (PCL) as the pilot said, "Break it out."

The PCL read: "FLAPS/SLATS FAIL TO RETRACT"—page 20, and I began to read it aloud.

The pilot continued to climb to 10,000 feet to troubleshoot, as I went through the checklist telling him what to do. As we dealt with our problem, we felt a little shudder that seemed to come from the right side of the aircraft. It may have been a chug, a sign of a compressor stall, or one of the drop tanks beginning to transfer. At that point, I was too engrossed in the first emergency. I reached step 13, which called for us to fully cycle the flaps and slats. When we did this, the slat problem was corrected. With one crisis averted and a second assessed to be minor, we continued the mission.

I called our representative in the tower and told him what was going on and that we were going to continue with the mission. In the back of my mind, I remembered what the skipper had said earlier, "Today would be the worst of all days to divert because the boat is heading east in the morning."

Bang! A second chug, and this one was much worse than the first. I felt the jet roll left as the pilot said, "We're going home."

Seventy miles from the ship and 100 miles from our divert, MCAS Cherry Point, we were in a tough position. The boat still was launching aircraft, so we would have to circle overhead for 20 minutes before landing or head to Cherry Point, where the jet would be down and unable to get back to the ship before the translant.

The pilot set the throttles at 80 percent, and we headed to mother. I once again was reading from the PCL, this time for a single-engine approach. Our plan was to make a constant-power descent to 2,000 feet and then setup for an eight-mile straight-in to the ship. Since we didn't know how the engine would respond to throttle movements once we called the ball, we briefed a single-engine approach in case the engine failed on final. The air boss told us to charlie, so we gradually descended and positioned ourselves for the approach.

The gear and flaps came down without any problems. The pilot kept up the power on the starboard motor until 2.0 miles, when he pulled power to achieve on-speed. From then on, each time the throttles were moved the starboard engine sounded like it was making popcorn. Instead of making VSI calls, I was saying, "Tapes and gauges are good," over and over. After an OK-underlined pass into the 3-wire, paddles told us to secure our starboard engine, "Now!"

Everyone watching our approach knew we had serious engine problems. The PLAT camera showed numerous flashes as our engine went through its death throes before seizing on deck. The LSO later said that, with each engine chug, a huge flame was thrown aft of the aircraft tail. To complicate matters, the slats again refused to retract as we cleaned-up in the landing area, leaving us stiff-wing and in the way. The flight deck scrambled to make room for a Prowler that now was twice as wide. Finally, we cleared the LA and taxied to our line crew, who eagerly began to repair our jet.

The investigators still are determining whether the engine failure was because of FOD or if it was a component failure. There is no procedure for this type of emergency around the carrier. At Whidbey, it's an easy decision to bring the jet back to the base and land, but around the boat, there are other considerations: Is the deck ready, do I have enough fuel to hold or divert, and is there a divert available? We discussed these considerations at our next aircrew meeting and put together a decision-matrix to aid crews in responding to engine chugs. Ultimately, I was comforted to know most of the squadron aircrew would have done what we did.

> In the back of my mind, I remembered what the skipper had said earlier...

Ltjg. Fitzsimmons flies with VAQ-140.

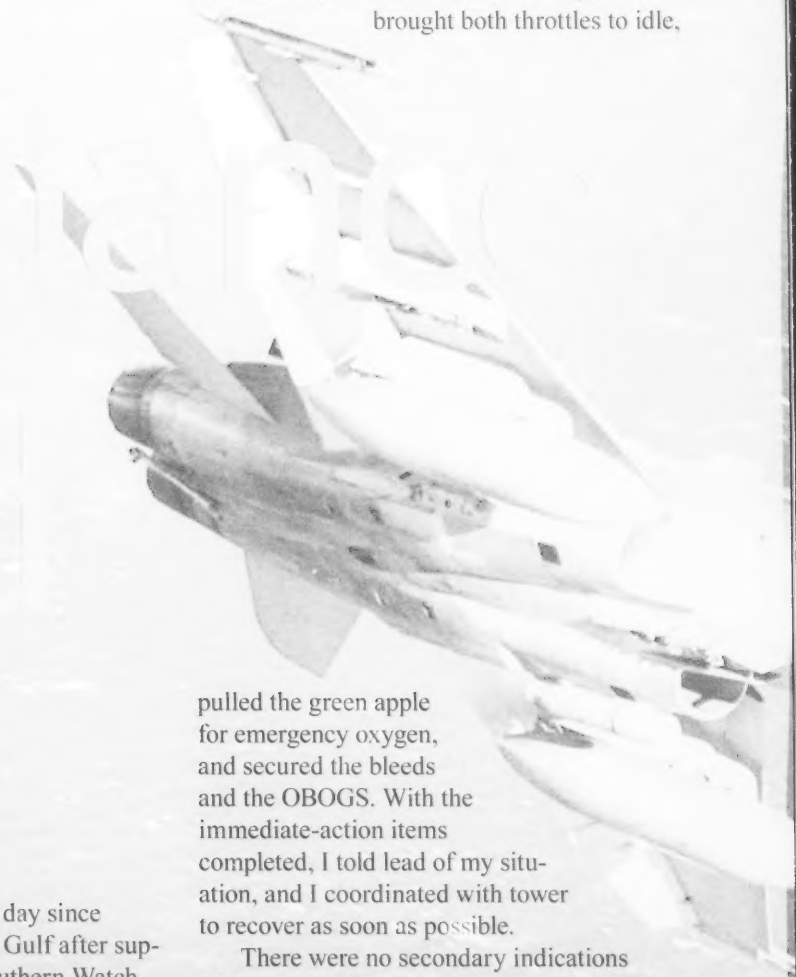
This Isn't the Type of Orientation I Had in Mind

By Ltjg. Ray Barnes

It was our first full fly day since departing the Persian Gulf after supporting Operation Southern Watch. We hadn't seen clouds in weeks, and the temperature finally had dropped into the 80s. I was looking forward to a 4 v X self-escort strike and a day trap. What could go wrong?

The Case II launch proceeded normally, and I climbed to 10,000 feet to get the 2,000 pounds of gas to put me back on ladder. Because of the lower temperature, my Hornet was much more responsive than it had been in the Gulf.

The good visibility let me see the USS *Carl Vinson* battle group to the east—our relief in the 5th Fleet AOR. I found the S-3 tanker off the nose and began my rendezvous. Everything was going well until Betty broke the silence with, "Bleed air left. Bleed air left," followed by the same for the right. I brought my scan inside, and sure enough, both bleed-air-warning lights were illuminated. I had excess knots, so I brought both throttles to idle,



pulled the green apple for emergency oxygen, and secured the bleeds and the OBOGS. With the immediate-action items completed, I told lead of my situation, and I coordinated with tower to recover as soon as possible.

There were no secondary indications of fire, and the engine display showed no abnormal readings. After double-checking the procedures in my PCL, I passed aft of the ship and began an easy descent for a recovery, flying under marshal's control.

Since I had been airborne for all of five minutes and had a lot of fuel to get rid of, I turned on

the dumps and thought about my situation. The lack of OBOGS and throttle boost immediately were obvious, and I realized ECS cooling and external-fuel transfer also would be affected. I began speaking with a squadron rep on the ship (who turned out to be the only guy in the squadron with less flight time than me), and after covering all of the steps again, we agreed a straight-in on this recovery was in order. I descended to angels 1.2 and hooked in at 10 miles.

I pulled up the fuel display to see how the fuel dump was going and saw I had 1,300 pounds of fuel trapped in the centerline-external tank and 1,400 pounds in the right-external tank. Since we can't trap with the centerline tank over one-quarter full, I told my rep I would have to jettison the tank or divert. Unfortunately, we were in the Indian Ocean conducting blue-water ops. The nearest divert was 350 miles away in Oman—not a practical alternative.

After the rep considered how it would look if Rockets 14 and 15 (of 15) decided to pickle-off a fuel tank, he notified the XO, who got CAG approval. We double-checked all the jettison settings, but nothing happened when I pushed the red button. The station was selected, stores were selected with the select-jett knob, and master arm was on; but SIM, that nemesis of strike-fighter pilots everywhere, still was boxed. After deselecting SIM, the fuel tank came off without a problem, and I continued the approach. My usable fuel at max trap would be close to tank state, so I requested a tanker hawk as well.

Standard-operating procedure for the last-day recovery was to set the base-recovery course directly into the sun, and the ship did not disappoint me. I began to break out the ship at two miles and continued down with good bull's-eye. I told paddles my approach would be without throttle boost, and, as I hit the start, I was clara lineup, as well. The low sun washed out the landing area. Paddles kept me on centerline, and I dropped the jet in for the OK 2-wire, ending my "good-deal" day flight.

What did I learn from this experience? Dealing with an emergency involves more than just immediate-action items. By securing the bleed air with no divert and 2,700 pounds trapped in the external tanks, we had some decisions to make. What configurations are recoverable? When is tank jettison necessary? What will the usable fuel state be on the ball at max trap? If a real leak in the bleed-air system is the culprit, time is critical because the hot air could cause a fire.

Postflight inspection showed a weld on the bleed-air ducting had cracked and had begun to burn the insulation surrounding it before the primary, bleed-air-shutoff valves closed. Had we earlier recognized the need to jettison a fuel tank, we also would have delayed the fuel dumping to give us more time.

I also learned that a thorough understanding of aircraft systems pays big dividends when thinking through the consequences of an emergency. Bleed air in an FA-18 is used in many other systems we tend to take for granted. Last, with good communication, even the two most junior guys in a squadron have enough knowledge between them to make responsible decisions and to get an aircraft on deck.

Ltjg. Barnes flies with VFA-15.

Photo by PH3 Alex C. Wise
Modified

Cockpit Scan

and Loss of Situational Awareness

By Cdr. Andy Bellenkes and Capt. John Ford

It's mid-morning, and the five members of the TYCOM Fleet Naval Aviation Evaluation Board (FNAEB) are listening to a young lieutenant explain why he has been unable to land aboard a carrier at night. This board would recommend to the admiral whether this aviator should be allowed to continue flying or not—a weighty responsibility and one not taken lightly. The officer in question was a good stick, an aviator who could get onto the carrier deck with no problem during daytime ops. But his night landings were messy.

The lieutenant's problem had come to light in one of his squadron's periodic human-factors reviews. That human-factors board had recommended extra training and had given him a date to get up to quals-level performance. The date came and went, but the lieutenant still was having serious problems. He couldn't maintain a good scan, especially on final approach from in-the-middle to in-close at the ship. His scan, which should have been, "Meatball-AOA-lineup, meatball-AOA-lineup, meatball-lineup, meatball-lineup...," became "Deck, deck, deck...no ball!" Upon hearing this, all five members of the board shook their heads, almost in unison. They'd heard this all before. Most cockpit crews appearing before this board had said virtually the same thing: Their visual scans had broken down, severely impairing their ability to fly. Why?

Think back to when you were in that first VT or HT squadron learning. Were you taught to scan both inside and outside your cockpit? Did you receive any formal, basic, scan training? Some instructors told you when and where to look, but how did the instructors know if you were doing it right? Whether you were in the cockpit-procedures trainer or in your aircraft, instructors assumed if you were on heading, altitude and airspeed, then your scan must have been good.

Developing a good set of scan patterns isn't given high priority during training. This is disturbing because one of the most common forms of visual problems cited in mishaps is the breakdown in cockpit scan. This error has caused midairs and near-midairs, CFIT, inability to get onboard the ship, spatial disorientation, and loss of SA—according to data from the Naval Safety Center's Human Factors Analysis Classification System (HFACS), 30 percent of mishaps in the past decade.

What is scan? Aircrews regularly monitor their aircraft, paying attention to information from inside and outside the cockpit. Visual scan is a sequence of these monitoring tasks. Scan characteristics (where you look, how frequently and how long) are determined not only by the complexity and importance of the information provided by a particular target, but also by your level of expertise.

Studies of scan during instrument flight were conducted in the 1940s and '50s. They found several interesting things:

Aircrews quickly create scan and fixation patterns for each maneuver.

How long you fixate depends on your ability to observe and interpret the information from a target.

The number of scan visits to a target (e.g., cockpit instrument, another aircraft in formation flight, and a landing zone) depends on how important you think the target is.

The path from training to expertise. Less experienced aircrews tend to scan ineffectively, making them more vulnerable to problems such as visual fixation, tunneling in on specific indicators, or the "electric-jet syndrome" (where normal scan is abandoned in favor of using data presented on newer digital avionics). Worse, many novice crews do not know where and when

to scan; they don't know enough about what produces and controls their aircraft's state. These individuals may scan only their primary instruments, neglecting the secondary indicators that actually give them information about the cross-coupled events associated with controlled flight.

What they need is a "mental model," a comprehensive understanding of a system and its dynamics. Mental models are refined with experience. Less experienced crews sometimes employ random, irregular scans, or, alternately, a more rigid scan that isn't sensitive to the changing needs for information from one moment to the next. Experienced pilots often feel uncomfortable when transitioning to a new aircraft because of a conflict between their mental model and their less-than-optimal scan in this new aircraft. They know they must cross-reference major attitude instruments (ADI, HUD, etc.) with basic instruments (turn needle and VSI), but their scan is too irregular or rigid to include these instruments.

More experienced crews are more flexible in their visual scans ("I can be thinking farther ahead of my aircraft and seeing more of the details happening around me"). They can react automatically to what they scanned, and if you asked them what triggered their reaction, they probably couldn't tell you. They develop better mental models, and they can scan all critical information sources ("I am no longer a 'HUD cripple"). They anticipate things more effectively.

Optimal vs. non-optimal scans. Aviators must balance the benefits gained from using information from a scanned target while minimizing cost or risks of leaving other stimuli unobserved ("I've gotta stare at my ADI until I figure out what it's telling me, so I'll ignore my airspeed for a while, and my oil pressure won't be changing much, and…").

Scan strategy used during one phase of a mission (e.g., searching for a "bad guy") will not be the same as that used during another mission phase (e.g., landing). As you become more effective at extracting data from a target, the task of perceiving and processing that information becomes more automatic. Crews using non-optimal scan may fixate or scan inappropriately, thereby missing important information.

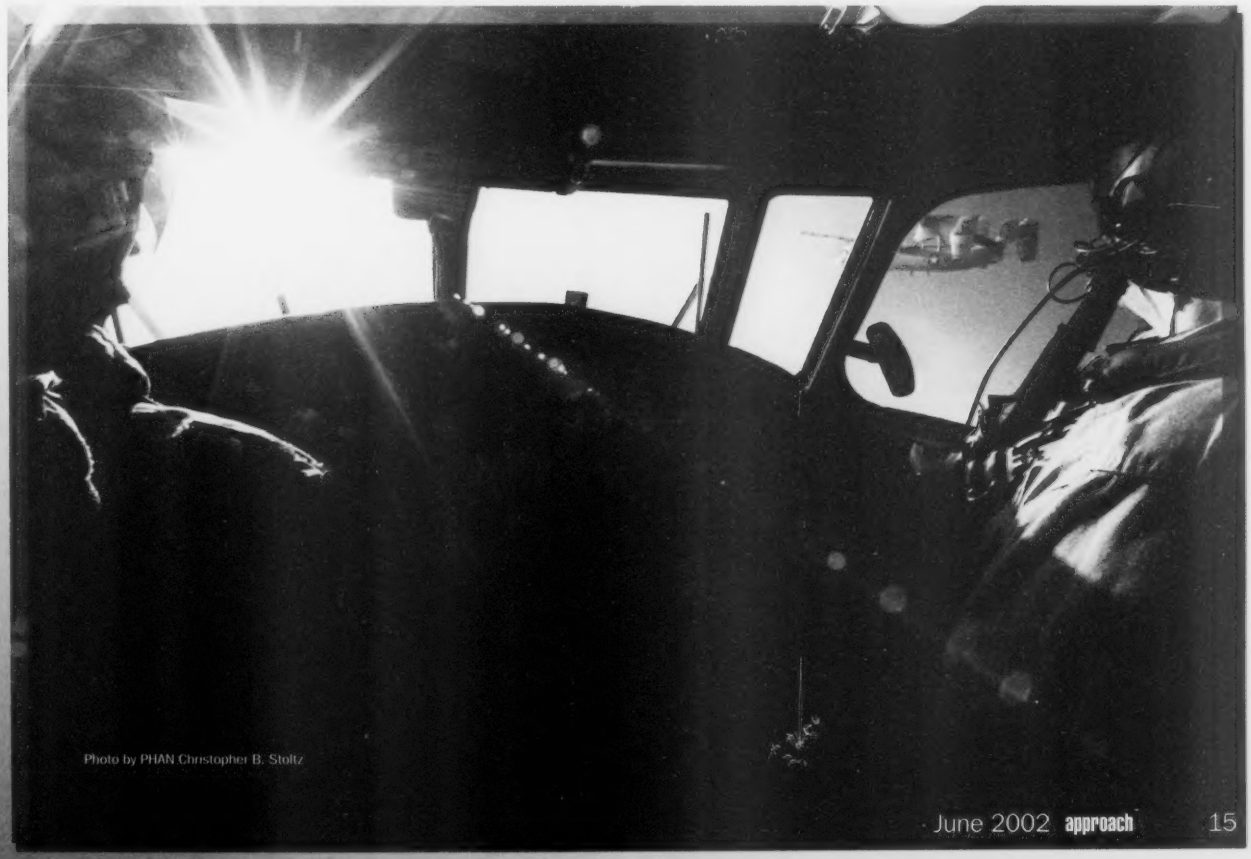


Photo by PHAN Christopher B. Stoltz

They may form a rigid scanning pattern, which precludes them from being able to flexibly change a scan pattern to fit a changing flight regime. IPs: Does this sound like your last problem student?

Aviators with considerable IFR flight time tend to maintain a scan that gives them sufficient data to adjust the controls but still maintain performance within the strictures of altitude, heading and airspeed requirements. Research has shown that experts also dwell on critical instruments for shorter times than do novices, who tend to fixate. The experts are better able to assimilate information, based on their expectations from the mental model.

The officer in question was a good stick, an aviator who could get onto the carrier deck with no problem during daytime ops.

How is scan taught? Aviators can learn how to develop good scans very early in flight training and in the simulator. However, teaching isn't standardized—it may be given short shrift or not taught at all. When scan is taught, instructors commonly employ a technique known as "guided training," whereby students are told which instruments to scan and when to scan them. The instructor assumes if the aircraft is not where it should be, then the crewman has not controlled the aircraft due, in part, to ineffective scan and cross-check techniques. Symptoms of poor scan include a student "chasing" the target data rather than controlling the aircraft, or a student fixating on specific targets rather than cross-checking data sources. Without monitoring scan behavior during unguided flight, there is no way to make sure any learning has occurred.

How should scan be taught? From the onset of flight training, students must learn to scan in a way that helps refine their mental model of the aircraft and tasks at hand. Instructors should provide a structured, standardized program aimed at teaching where and when to look, and why. Instructors must be able to assess how well the student understands the basics of flight through three dimensions. This can be done by verbal testing and the use of a scan monitor which is currently used in research. A scan monitor tracks eye movement and displays scan patterns. An instructor can tell the student if the scan strategy being used is optimal or not. This training would be incorporated into the formal training syllabus, scored and recorded. Evaluations are based on set standards rather than subjective grading that varies with instructors.

When should scan performance be tested? It's most important at the beginning of primary flight training; it should be coupled with classroom briefs and reinforced in cockpit-procedure trainers and simulators. It also should be reviewed periodically, even for those who have

many hours of experience. Safety Center statistics suggest even expert crews are susceptible to scan breakdown. Tests also should be given when someone transitions to another aircraft (when they might switch from digital to analog instruments, or from head-up to head-down displays), or when a crew takes on a different type of mission. An aviator experienced in tactical flight may not have an effective scan for search and rescue.

What are the benefits of standardized scan training? Instructors can teach and test in a way that can be measured and replicated. They actually can observe scan performance rather than infer it, and students can get accurate, real-time feedback from the instructor.

Why scans break down. Even experienced crews aren't immune. The reasons for this are many and varied; here are a few commonly cited in hazard reports and safety investigative reports:

Distractions: Communications, wandering thoughts, unexpected changes in aircraft state, and anything else that will get you behind the aircraft. By their nature, such distractions will interrupt or hinder the use of effective scan strategies.

Workload: This is a big problem, especially when the mission is complex and hazardous and you aren't well-prepared. Workloads have a way of increasing very rapidly when an unexpected problem arises, especially during critical parts of a mission (e.g., a moonless night, bingo fuel state, or when you're in the groove and suddenly lose hydraulics).

Automation: One of the paradoxes of having more automation in the aircraft is that while it may assist you with some chores, your workload also may increase. If you have low trust in your automation (perhaps it is faulty half the time), you may not use it, or you may try to counteract its effects. On the other hand, you may become over-confident in your automation and, in doing so, become lax.

Display design: The use of certain visual displays (e.g., helmet-mounted and panel-mounted, multi-function displays) can lead to scan breakdown. Crews become totally reliant on the MFD images, and their gazes may become transfixed in a manner similar to that experienced during normal television viewing. This "electric jet syndrome" is hard to overcome and often contributes to mishaps.

Conclusions: By now, you can see how important it is to have and use a set of effective scan strategies. However, this article only scratches the surface of this critical issue. For more information, contact your aviation safety officer (ASO). All ASOs graduate from the six-week aviation safety course offered at the Naval Postgraduate School, which includes study in human factors. With this background, the ASO joins your flight surgeon, aviation physiologist, and aviation experimental psychologist as your organization's human-factors team. They are there to make sure you and your shipmates safely complete your mission and, in doing so, help to maintain your unit and the fleet at peak operational readiness. Indeed, maybe they can help all of us steer clear of an FNAEB or FFPB!

For more information contact Cdr. Bellenkes at: ahbellen@nps.navy.mil

Cdr. Andy Bellenkes is a professor and Capt. John Ford is the director at the Naval Postgraduate School, School of Aviation Safety.

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Cdr. David Baranek

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Photo by Sgt. Kevin Dolloson
Modified

How Do Your Instruments Look?

By Lt. Harrison Schramm

Our mission was to fly passengers and cargo from an Arabian Gulf airfield to an aircraft carrier. My wingman—another Lt.—and I had flown to the carrier the previous day to be available for an early-morning launch. We had a nice afternoon getting lost on the ship but managed to eventually find the "autodog."

The wing Ops O greeted us at dinner and told us the ship expected to remain underway. It would loiter 15 miles to the east of the airfield, making our transit due west. Before we hit the sack, we had a chance to watch our fixed-wing brethren bag a round of night traps.

We briefed at 0600 and talked with the boss over the phone. The ship was calling weather 1,000 and three with haze. The haze was the major factor, as part of the world has a permanent dust layer that limits visibility to less than one mile. We manned up and were turning a few minutes before our takeoff time of 0700. We had planned to fly as a section of two to de-conflict with the numerous other rotary-wing traffic we expected to see. I was Dash 1 on spot three in H/W 11, and my wingman was Dash 2 on spot four in H/W 00.

I called tower for breakdown, "Boss, 11 and 00 set for breakdown and launch, spots three and four." We felt good about having both aircraft up and ready for takeoff.

"Roger, break you down," he replied. I could

tell the boss also was happy our birds were up and ready.

I had my copilot "clean me up" for takeoff, and we lifted as a section of two and departed straight ahead. Once established at 200 feet, we put on the *alt hold* and turned direct to the airfield, bearing 260 at 12 miles. I gave my copilot the controls and relaxed a little bit. I let a last look at the map occupy the quick flight into the beach.

We were airborne for 10 minutes when I was overcome by a sense of mounting discomfort. I looked at the instruments, and things still made sense, mostly. The TACAN showed a good bearing to the field, but the DME was not decreasing. While my copilot kept flying, I did some quick troubleshooting. I flipped up the TACAN mixer switch, and we were getting a good, strong ident. I verified the TACAN channel, and it also was correct. From all appearances, the TACAN was working. Then, I decided to tune in the boat.

According to the TACAN, the ship now bore 260 at nine miles, which meant it was straight ahead. I took the controls for a moment and made a gradual right-hand turn. Sure enough, the TACAN needle continued to point "up and down," while the RMI card turned as normal. Somehow, my TACAN needle had gotten stuck. As this realization came over me, I keyed the MIC and said, "00, take lead."

00: "Uh…"

11: "00, I need you to take the lead."

00 passed me on the left, and I fell in behind him. We continued our discussion after I was established on the wing. It went something like this:

00: "Hey, is 260 still a good heading?"

11: "I don't know."

00: "My TACAN is pointing the opposite way. I think my instruments are screwed up."

11: "Let's follow yours. I'm sure mine are screwed up."

We followed 00's lead and made an uneventful landing at the field. On deck, we did more troubleshooting and found while our needle had failed, our CDI still worked. We used that to determine our bearing information for the next couple runs until we could get it fixed. Our ATs determined the syncro motor in the pilot's RMI had shorted out. Since the two motors are on the same circuit, the failure of the pilot's side also caused the copilot's side to fail. This situation is not addressed in NATOPS or by any failed-card training at the HTs or the FRS. But, it still happened.

Our biggest mistake was assuming the airfield remained in the direction it had been briefed over 14 hours earlier. We never questioned that until we were airborne, traveling in the wrong direction, for 15 minutes. That assumption fed on itself: I didn't ask for pigeons from the ship because I had a "good" TACAN lock. I didn't question my TACAN lock because it fit the pattern of my initial assumption. My wingman did not question my (bad) navigation because it fit the pattern of what we expected. Instead, he rejected his own (good) navigation.

Aircraft systems can fail in unexpected and unpredictable ways. The only indication we had that anything was wrong was the feeling that something didn't add up. Sometimes that's all the indication you get. Sometimes that's enough. Confirm your assumptions before you make decisions based on them.

Lt. Schramm flies with HC-6.

We were airborne for 10 minutes when I was overcome by a sense of mounting discomfort.

Photo by Senior Airman Myles Cullen
Modified

ORM Corner

Communication an
A Lifesaving Combo

By Ltjg. Kent Jones

Our detachment was four months into a six-month WestPac. While in the Northern Arabian Gulf, our six pilots flew primarily at night. It was a rare occasion not to be flying or assigned landing-signal officer duties. We finally got into a routine, and I hoped to get on a normal sleep schedule. This, however, quickly changed.

Our ship's combat-systems officer (CSO) had a history of heart problems. He had seen a specialist in San Diego before deployment and was cleared to go. The stress of deployment and his job didn't seem to affect him, until one afternoon well into the cruise. The ship's senior corpsman, an experienced HMC, approached our detachment's officer in charge and told him the CSO was in the medical office. The CSO was complaining of a very sore chest and had difficulty breathing. Since the ship doesn't carry advanced heart-monitoring equipment, the senior medical officer, embarked on the carrier, recommended transporting him to a hospital. Isolated in the northern part of the gulf, we were too far away for a ship or RHIB transfer. Our choices were to medevac him that night or transfer him sometime the next day.

Although we did not know how critical the CSO's condition was, we looked into several options to medevac him that night. We checked with the maintenance officer and the chief if either aircraft could be ready to fly soon. We also made sure a crew was rested enough to make the flight.

We determined the nearest proper medical facility was in Bahrain. That hospital was 220 miles to the south but was closer than the carrier in our battle group, which was even farther south.

Now came the difficult decision. Our SOP states that flights from ship to shore shall not exceed 200 miles, and we were not authorized to take passengers at night. We looked into the possibility of using another ship as a lily pad where we would land, refuel and quickly take off again. We decided to keep this as our backup plan as these ships were not directly in our route of flight. We gathered the crew and had an ORM session. We considered the environmental conditions (night), fuel planning, and going to an unfamiliar airfield.

After discussing our options and making sure the entire crew was comfortable, we decided to fly the medevac. We also brought a hospital corpsman with us, in case of any in-flight medical emergencies. We made sure we had the flight

ORM Corner

Please send your questions, comments or recommendations to Ted Wirginis or to Capt. Denis M. Faherty, Director Operational Risk Management.

Mr. Ted Wirginis's address is: Code 11, Naval Safety Center, 375 A St., Norfolk, VA 23511-4399. (757) 444-3520, ext. 7271 (DSN-564). E-mail: twirginis@safetycenter.navy.mil

Write Capt. Faherty at OPNAV Code N-09K, 2000 Navy Pentagon, Rm. 5E-816, Washington DC 20350-2000. (703) 614-8430, (DSN-224). E-mail: faherty.denis@hq.navy.mil

d ORM—

Our SOP states that flights from ship to shore shall not exceed 200 miles, and we were not authorized to take passengers at night.

charts and pubs, and we arranged for an ambulance to meet us at the Bahrain hangar. While this was going on, a small group of maintainers worked overtime to prepare a helicopter to fly on short notice.

We took off and had very favorable winds aloft, easily making the airfield with our patient in good health.

In hindsight, the decision to take this mission should have been easy. However, we had to consider all the factors involved because this would have been the perfect time for something to go wrong—while everybody was preparing to launch, or entering an unknown airfield in the middle of the night. What allowed everything to go smoothly and safely was good communication, use of operational risk management, and crew briefing. Everybody involved was informed: the three members of the flight crew, ship's personnel, our maintenance team, and even the LSO.

Ltjg. Jones flies with HSL-37.

That Guy Is Going to Load!

By LCdr. Paul V. Neuzil

Last October, the operations and maintenance officer told me to take a crew to Greenville, S.C. We were to pick up the squadron's newest AIP aircraft. It was being modified at the Lockheed facility at the Donaldson Center.

As any good pilots would do, we began our research into the type of airfield and local area where we would operate. Being the senior pilot and having experience flying out of this area, I took the lead in briefing and preparing the crew. We looked up the airport information, approaches to the Donaldson Center and the surrounding airfields. We'd be landing at an uncontrolled civilian facility. This meant we would operate jointly with civilian aircraft under rules we were not used to but certainly trained to follow.

After arriving at the field, we consulted with Lockheed-operations personnel concerning the local area and airfield-flight rules. We also talked with the airport-facility manager and the local FBOs on the type of traffic we likely would encounter. From my experience as a training-command-instructor pilot, I knew our crew was thoroughly prepared, and they had completed a solid operational-risk-management brief. We were ready to operate out of this airfield.

After the inspections and ground turns were completed, we went on a functional-check flight. It went without a hitch, and all the aircraft systems were working.

We headed back to the Donaldson Center, and I was confident the most difficult part of our flight was complete. What could go wrong? I even put the third pilot in the left seat, and I was the copilot in the right. This meant I would talk to the controllers and other aircraft on arrival at Greenville. We received radar vectors to final for the ILS and were approximately 20 miles from the field.

Photo by Matthew J. Thomas
Modified

I had one radio tuned to approach and simultaneously was monitoring the unicom frequency. I heard two civilian aircraft in the local pattern. I briefed the flight crew about the traffic and asked them to keep an eye out. I also knew I had another civilian aircraft behind me on approach.

We were cleared for the approach and were told to contact the unicom frequency. Since we had clear weather with unlimited visibility, I canceled my IFR clearance and closed out my flight plan while on approach at 10 miles. I had a visual on the two aircraft in the pattern and wanted to tell them my intentions. At 10 miles, I made my first unicom call. I coordinated our landing with both aircraft. At five miles and on short final, I made the required radio calls and was rogered by the other two aircraft.

The landing went smoothly, except we landed a little long, which meant we would have to roll to the end and taxi back 4,000 feet on the runway to our turn off. Again, I coordinated this with the two aircraft in the pattern, and they flew an extended downwind, allowing me to turn around and taxi back. I also received a call from the civilian Learjet behind me on approach that he was 10 miles out and had me in sight.

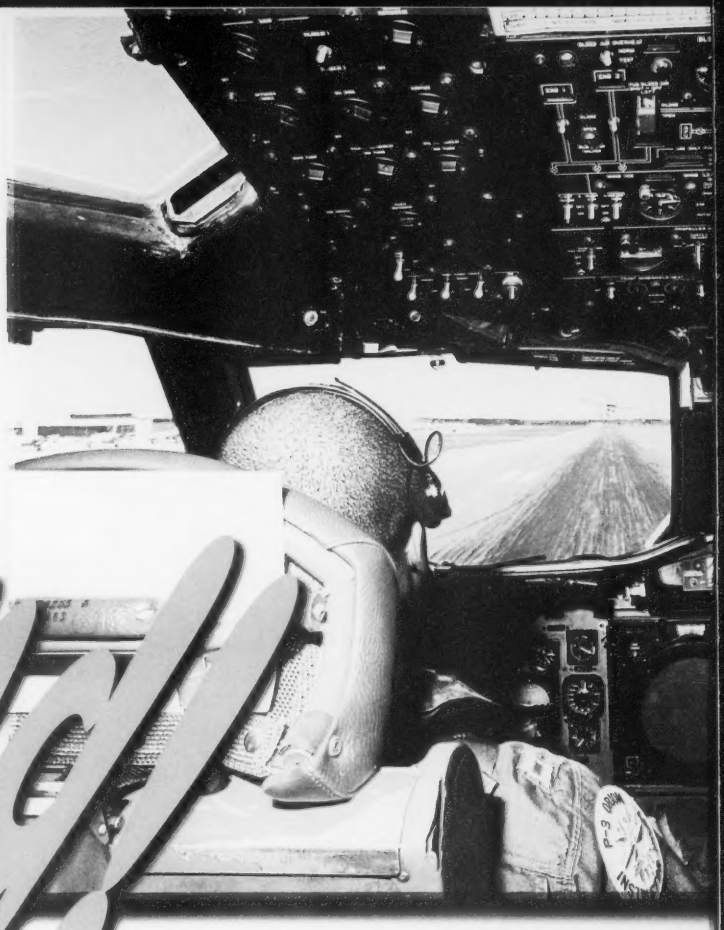
We turned around and proceeded back to our turnoff. I had the pilot expedite his taxi back on the runway to help with the traffic in the pattern. When we were 2,000 feet down the runway, I noticed an aircraft on left base. It made a turn to final for landing on the same runway on which we were back-taxiing. I felt that sinking feeling in the pit of my stomach, as I realized he was going to land. I made a quick (OK, frantic) call on the unicom frequency to alert the pilot that I still was on the runway. There was no reply, and the aircraft continued for the runway. While I looked for an out, I told the pilot to turn left onto an old taxiway that was just big enough for a Cessna but an extremely tight fit for a P-3. Upon turnoff, I told the flight engineer to secure our outboard engines to prevent damage. Meanwhile, the Cessna landed and turned off at the taxiway that we should have used. We continued to taxi, turned around at the local FBO, and once again unsuccessfully tried to communicate with the aircraft. We then taxied to the Lockheed facility without further incidents.

Operations at uncontrolled airfields always should raise the hair on the back of your neck. You can do everything by the book and still have an incident. You never know what that other person will do, so plan for the best, but be prepared for the worst. In this case, we had a civilian pilot who did not talk on the radio and landed with another aircraft on the runway. This is yet another reason we need to keep our heads on the swivel and heed the see-and-avoid doctrine.

LCdr. Neuzil flies with VP-47.

I felt that sinking feeling in the pit of my stomach...

That Guy Is Going To Land!



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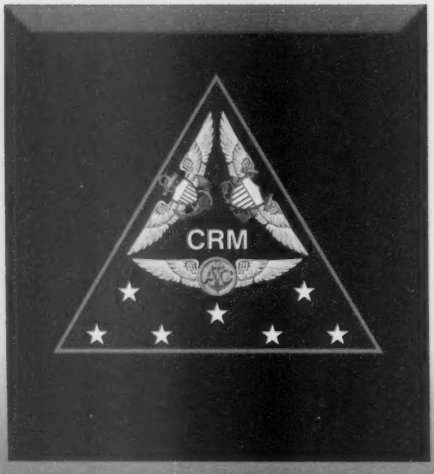
Crew Resource Management

You, Too, Can Sch

Situational Awareness
Assertiveness
Decision-Making
Leadership
Communication
Adaptability/Flexibility
Mission Analysis



CRM Contacts:

Cdr. Scott Stroble, OPNAV N789F3
CRM Program Mgr.
stroble.scott@hq.navy.mil, DSN 664-7721

Last fall, my command put "all the necessary links in place" for a mishap. How it happened was a real eye-opener. I was motivated to write this article because my squared-away, fleet helo squadron, with a proactive safety program, easily fell prey to not paying attention to the business at hand. I hope to grab your ear and keep you from making the same mistake.

We had had a strong fly-week at the squadron. On Thursday afternoon, my XO gave me a heads-up on a Wing requirement to transport several GAU-16 machine guns and associated hardware from NAS North Island to the Naval Strike Air Warfare Center (NSAWC) at NAS Fallon. The NSAWC staff needed the gear to support a Seahawk Weapons and Tactics Instructor (SWTI) course the following Tuesday. The Wing pulsed fleet squadrons along the HSL flight line to see if anyone could divert a scheduled flight on Friday to get the gear to NAS Fallon. This tasking was straightforward, certainly not out-of-the-box. However, as the word filtered down to squadron ops officers, the urgency to do this mission naturally ratcheted up.

As the crow flies, the distance is only 600 miles. For fixed-wing aircraft, it is a one-leg flight. For an SH-60B—on a good day with good winds—it is about a five-hour, two-leg flight with one en-route stop for fuel. However, with any headwind, the flight can turn into three legs and two fuel stops. Weather was not expected to be a factor—the freezing level would be slightly above the SH-60B's ceiling of 10,000 feet. To top it off, flying IFR was not an option because all the minimum en-route altitude (MEA) combinations exceeded 10,000 feet. So, flying VFR meant the aircraft would be at or near this ceiling, over unfamiliar mountainous terrain, to an unfamiliar destination, with a junior aircrew.

On Friday morning, the command participated in morning PT and team sports. Then we had an AOM, training for the enlisted aircrew, and a maintenance day. I approved a light flight schedule for the day that consisted of a local-area flight for a junior aircrew.

The Wing requirement to get these guns to NAS Fallon still was valid. My ops officer determined that commercial-overnight delivery or the station's C-12 were not viable options to move the gear. After a mid-morning discussion with Wing Operations, my ops officer said the command could do it with the scheduled aircrew and aircraft. Every naval aviator seemingly has a built in "can do" switch spring-loaded to the on position—we were no exception. Factor in that the

edule a Mishap

By Cdr. Jim Gillcrist

upcoming Monday was a national holiday, and we had ourselves a real mission. So, I reluctantly accepted .

All this transpired through the morning as the XO and I worked "important squadron issues." In so doing, we lost sight of mission execution. I had assumed the aircrew would remain overnight after the delivery and return the next day. To me, this was a no-brainer. But the aircrew, which consisted of a newly designated helicopter aircraft commander (HAC), a slightly more seasoned HAC as copilot, and a junior aircrewman, wanted to fly there and return the same day. This made sense to the aircrew, I think, because the HAC had big plans for the long weekend. Can-do was the motto at the moment. The squadron and chain of command worked end of the week business, while I approved this change in the daily flight schedule. As a team, we had the best intentions to get the job done.

I hope you can begin to see how we wrote a flight schedule with "all the necessary links in place" for a mishap.

So what happened? Our daring aircrew planned and filed the mission to get the gear there and fly back the same day. Weather was holding. With a few aircraft issues thrown in and the preflight completed before noon, we were 1.5 hours behind the originally scheduled launch. Nonetheless, we pressed on, ready to launch.

Next, the funniest thing happened. I walked out of my office and bumped into the aircrew milling about rather oddly in the hallway. I approached them and asked, "What's the hold-up?" As we peeled back the onion, it became apparent that the aircrew had come back into the squadron to reevaluate the entire mission. They actually had strapped on the aircraft and were at "start engines" on the checklist. The feeling in the pit of their stomachs that all was not right caused them to return to the squadron. The planning was poor, and the CO's reluctant approval of the mission was worse. We needed to take a time out. And, we did!

I cancelled the mission on the spot, with a huge sigh of relief from the junior HAC who had signed for the aircraft. After talking with the Wing and NSAWC folks running the SWTI class, I learned that the guns were needed no later than close of business on Tuesday. The decision was simple. We decided to get an early start on Tuesday, deliver the gear, remain overnight, and return Wednesday.

Why hadn't we followed this course of action in the beginning? What happened to the oversight of the front office CO and XO team to recognize a mishap? Why didn't I have the gumption to just say "no" to a half-baked plan? These questions bothered me and made me wonder how often other squared-away fleet squadrons unknowingly set themselves up for this kind of scenario.

Cdr. Jim Gillcrist flew with the HSL-43 BattleCats.

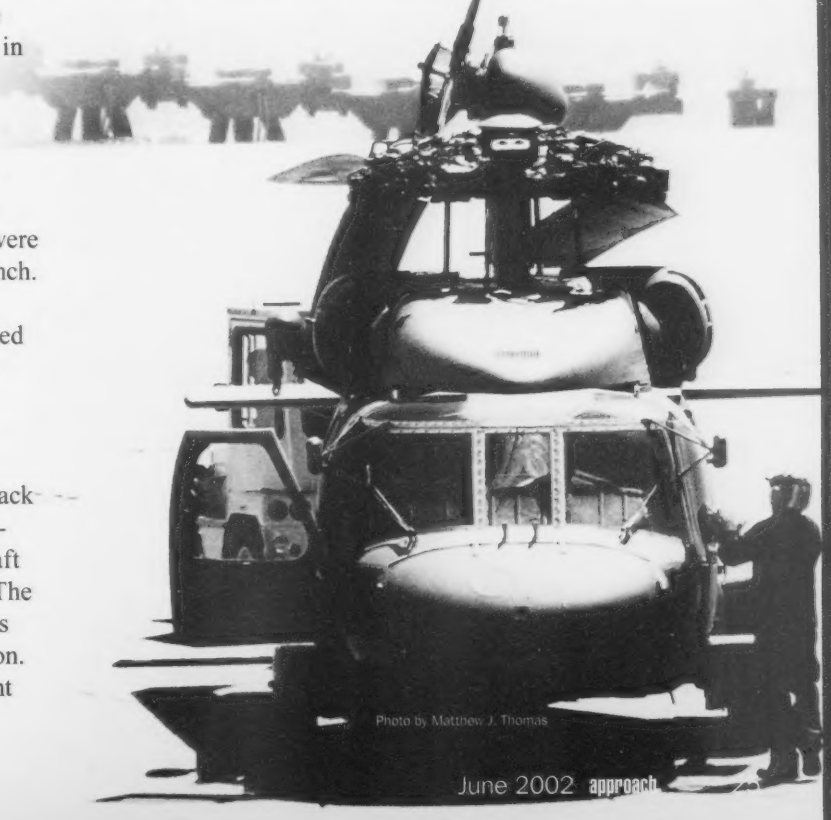


Photo by Matthew J. Thomas

Who Preflights the Carrier?

By LCdr. Chris Sund

Work-ups around an aircraft carrier offer many of the most exciting challenges any aviator ever will meet. The first work-up event is usually carrier qualification, or in most cases, requalification. It is a time when pilots young and old put on their game faces and apply an enormous amount of concentration to practice ball-flying skills and to look their best.

My trusty Hawkeye and I had finished requaling a few nuggets when it was time to get more fuel and take on a new pilot. I was the aircraft commander and sat in the copilot seat as our senior LSO finished waving. He was ready to take his turn behind the ship. We had had many flights together, including an entire work-up and cruise the previous year. When he jumped into the pilot seat, I breathed a big sigh of relief. I was ready to let down my guard a few notches, and let him take over the bulk of the flying. The refuel and taxi to cat 1 went smoothly. He likely would get his four passes, and we would be on deck and in the ready room with plenty of time for him to formulate his debrief excuses for paddles.

I thought about getting rest as we wiped out the controls and prepared for the acceleration. He saluted and off we went. As the shuttle hit the water brake, I heard a loud thumping directly behind my seat. The cockpit started to fill with what I thought was smoke. I couldn't believe this was happening to me—E-2s have a very bad

track record for surviving in-flight fires. Even though it was daylight and we were less than 1,000 yards from the boat, the situation was serious. The pilot immediately reacted and said, "Get your oxygen on, and I will start a downwind turn."

I quickly donned my mask, took the controls so he could strap on his mask, and told tower we had smoke in the cockpit. After a few moments, I knew it couldn't be smoke because, as I put my mask on, the vapor smelled more like the humid, outside air. I thought we had experienced some type of pressurization problem that caused the ambient air to condense. The pilot turned off the air conditioning and pressurization system, and, sure enough, it fixed the problem.

By this time, we were rolling around the 90, and the ship had cleared all the non-essential personnel from the flight deck. I called the ball, and the pilot made a nice pass right to the 3-wire.

As we cleared the landing area, I let go another sigh of relief. I was ready to be sidelined and to head to the de-briefing table. Although it took only moments from takeoff to recovery, I was ready to get out of the Hawkeye.

As we taxied back to the island, I was about to get my second major scare in as many minutes. I noticed the deck was relatively empty, and we had plenty of room to maneuver our aircraft to its tie-down spot.

As we took off our masks and discussed the problem, I heard another thump, and a huge cloud of what looked like white confetti came from the left prop. My pilot immediately "T-handled" the left engine and set the parking brake. I reacted by feathering the right propeller and securing the right engine. I heard the air boss yelling, "Shut 'em down. Shut 'em all down," as the engines stopped turning and the cockpit went quiet. The time compression of the moment caused me to think we had hit one of the postal clerks carrying a mailbag.

I had time to think, "Why are we getting that much mail on the first day of workups?" The white cloud was huge. What else could make all of that white confetti? I really thought we had killed somebody.

As we quickly left the aircraft, I saw the left prop had struck something, taking off about 18 inches of all four propeller blades. To my horror, I saw an open armored hatch under the left prop. The pilot and I looked at each other and then hustled off the roof. With our luck, if we didn't get below decks, surely lightning or some other form of divine intervention would strike us.

The SDO greeted us in the ready room and asked if we were OK. I said, "We're fine, but what about that little explosion on the roof we lit off, did anyone take any shrapnel damage?" It was a while before all the information was in, and we discovered what had happened. After reviewing the ILARTS tapes (which were trained on us for the previous emergency), we saw that, as the E-2 taxied over an apparently secure hatch, the prop wash sucked it open, and it struck the propeller. The hatch was undamaged while the prop was a loss. One of our troubleshooters did catch a small piece of propeller-spar shrapnel in the leg, but everyone else was unhurt.

A little-known fact about E-2s and C-2s is their specialized propellers are made almost entirely of fiberglass for this exact circumstance. Had we been equipped with a conventional metal or aluminum propeller, the damage would have been much worse, possibly fatal. The small bits of fiberglass found later were as far aft as the round-down. The hatch we struck was forward of the island, abeam elevator No.2.

I learned quite a bit that day. Getting comfortable flying with a familiar, seasoned pilot can lead you to let down your guard. Carrier operations leave no room for anything but a superheightened state of awareness. You must know the procedures stone-cold, whether aircraft specific, or, in this case, CV NATOPS. We quickly put the airplane where it needed to be. We told the air boss about our problem, and he limited the flight-deck personnel to the bare minimum. Preflights apply to everything, not just to your airplane. Take a hard look at your environment. If you see something that doesn't look right, fix it. That hatch probably never was secured since the ship pulled away from the pier that morning. If your maintainers open a hatch, be sure they dog it down.

Who preflights the carrier? Everyone. Our environment demands an all-hands approach to flight operations, from preflights to postflights. Take the time, and do it right.

LCdr. Sund flies with VAW-117.

Still Atta

By Lt. Michael Ruth

I was a new helicopter second pilot and was experiencing my first real taste of shipboard operations. It was exciting, yet, I still was wary of the new environment. The initial DLQ qualification in the FRS, and a short, week-long work-up, made up my vast seagoing background flying the mighty SH-60B, LAMPS Mk-III attack helicopter.

Our detachment was operating off the Southern California coast on a work-up for our WestPac deployment. The detachment had flown steadily throughout the exercise, and I was learning a lot during the short time onboard. I constantly tried to get an idea of the hazards and concerns inherent in this new operating environment.

We were to launch on a night mission to search for surface contacts in the area. I was flying with one of the senior HACs in the detachment, and I was concerned about being prepared. I still was a little wary around the flight deck of a cruiser at night because of my inexperience. I was tense during night launch and recoveries. The weather this night wasn't extreme: a cloud deck at 1,000 feet and some occasional high rolls. It was my first very dark night, though, with no moon and a cloud deck—my stress level was increased.

We briefed, preflighted and manned-up for launch, progressing through the checklists.

Photo by PH2 David C. Mercil

ched

During prestart checks, we encountered a maintenance problem and called a troubleshooter. Since the troubleshooting took awhile and because of high rolls, we put on high point and tail chains. After the discrepancy was corrected, the high point and tail chains were removed. Flight-control checks and start-up went as planned.

Sitting in the left seat having winds to starboard, I had the takeoff. We called for breakdown and launch, and we noted two chains and a chock being removed from each side. The flight deck cleared us, and we were ready to lift. I called to the LSO, "Ready to lift."

He responded with the expected, "Beams open, green deck, lift." I brought in power for takeoff. Almost immediately on our way up to the hover, the helicopter shuddered, tugged left and back. What the heck? Something was not right! We steadied in the hover for a second and got a feel for the situation. Once we relaxed a bit, the HAC called for us, "...to put it back down." Upon hearing this, I lowered the collective, smoothly put the helo on the deck, and called for chocks and chains. With the helicopter secured to the deck, the troubleshooters checked for damage. They found a piece of chain attached to the deck and another still attached to the aircraft. Needless to say, the crew felt that was enough for the night. The aircraft was inspected for damage.

What had happened? Although the tail chain had been broken down, it was not removed. Neither of us noticed if they were removed before takeoff. We normally make sure the tail chains are removed before manning the aircraft—which we purposely did not do because of the high rolls. We double-check their removal by looking out the rear view mirror for them. If any chains are still attached, they are seen stretching from the aircraft to the deck. In this case, the broken-down chain hung vertically and had been missed by everyone.

Anytime we deviate from normal operating procedures, we must look more closely at what is happening. The rough weather changed our pattern and should have alerted us to look for new hazards not normally encountered. Make sure your crew members are aware of your concerns before launching. I could not remember if I had briefed the crew that this was my first high sea-state, night flight from this class of ship. I was a little tense when facing those conditions that night.

Make sure the crew and the plane captains are aware of how the aircraft is secured to the deck. Since this incident, our detachment has implemented an added precaution with a walk-around by the plane captain before any launch. This doesn't relieve the aircrew of the responsibility but does add another safety check. Adequate communication—in this case, passing a complete inventory of the chains and chocks attached to the aircraft—could have prevented this problem.

Lt. Ruth is the admin officer for HSL-47, Det 5 embarked in USS *Princeton* (CG 59).

Almost immediately on our way up to the hover, the helicopter shuddered, tugged left and back.

What Are You Going to Throw

By Cdr. Dave Culbertson

I always thought day-VFR, functional check flights (FCFs) on FA-18s coming out of overhaul, repair, and modification at Naval Air Depot (NADEP) North Island would be routine and non-challenging. My experience over the last 18 months at the NADEP has proven otherwise. It's exciting and challenging because no two flights are the same. We observe and experience a multitude of aircraft systems malfunctions an operational squadron hopes never to see. It's rewarding because we are the "final check" to make sure the fleet receives a quality aircraft that stands ready to implement our national policy.

The mental preparation for a NADEP FCF is the same as in the fleet. Each FCF flight can be like a NATOPS-simulator check ride. Constant vigilance for multiple aircraft malfunctions is a must. It's a "What are you going to throw at me today?" attitude toward flight.

One of my most interesting (and perhaps frightening) NADEP test flights happened as I commenced the take-off roll in an early lot FA-18C on a fine spring day. I never envisioned this flight would be the closest I ever came to ejecting in 20 years of flying.

I initially noticed both engines were slow to stage into afterburner. I also noticed the engines surging slightly, and the variable engine nozzles (VENs) were oscillating. However, the engines appeared to be smooth and normal after deselecting the afterburners and continuing the takeoff roll. Therefore, I decided to transit out to the SOCAL W-291 to complete the FCF but kept a special eye on the engines.

While transiting toward the warning area, I selected afterburners several times, individually and together, for short and longer durations. There weren't any problems, so I continued with the flight profile. After completing the flight-control roll checks and 10,000-foot, engine-transient checks, I climbed for the high work.

During the climb profile, at 20,000 feet, an "Engine Left" caution cycled on and off. I retarded the left throttle to idle, reviewed engine parameters on the digital-display indicator (DDI) and the integrated-fuel-engine indicator (IFEI), and headed toward North Island. The caution cycled on and off, then it remained off with the power at idle.

I had experienced cycling engine cautions on previous FCFs, and they turned out to be nothing more than faulty connectors or sensors. However,

at Me Today?

this caution, coupled with the engine anomaly on takeoff, supported my belief that this truly might be an issue. In any case, I always treat each caution and indication like it is the Real McCoy.

At 60 miles from North Island, on the return-to-base profile, I began assessing the condition of the left engine. Initially, the engine parameters appeared to match at idle power, but after a few minutes, the "Engine Left" caution reappeared. The left engine was surging, the VENs were fluctuating, and the EGT was rising and bouncing around. Then, all of a sudden, the left-engine nozzle opened to 106 percent, with associated "L EGT HI" and "Engine Left" cautions. As I assessed the other engine parameters, I noticed the DDI-engine page and IFEI showed the EGT to be oscillating around 1,300 degrees Celsius. I secured the left engine and declared an emergency. Interestingly, the temperature indication never dropped, even with the engine shut down. I could not conceive of the engine surviving such a high temperature. Either a sensor was defective, the engine was going to melt, or a combination of both would happen, so I stayed alert for any fire indications.

As I started catching my breath and feeling confident the aircraft was going to make it—40 miles from home—the right engine began to surge from VEN oscillations. The right EGT indicated oscillations from 700 to 950 degrees Celsius. The right VEN was fluctuating plus-or-minus 15 percent, with associated "Engine Right" and "L EGT HI DDI" cautions cycling on and off. I needed just 10 more minutes of thrust from the right engine; it was my only hope for a dry landing.

I looked down at the cold Pacific waters and all the fishing vessels, thinking if I did have to do a silk-water landing, I at least would have a chance for a comfortable ride home. After preparing the cockpit for ejection, I said a few prayers. I felt like I had no choice but to stay with the aircraft until the right engine quit or a fire

...it was my only hope for a dry landing.

Photos by Daniel McGehee and Scott Jones

Knowing your aircraft systems, following procedures, and using good air-sense are tried-and-true actions to survive an emergency.

light illuminated. I kept the remaining surging engine at mid-range power setting and flew at 300 knots in the descent to North Island.

With good hydraulics from the right engine, I elected to stay fast and then to glide into position, lowering the gear at the last moment.

This action hastened my approach and kept the aircraft in a good ejection envelope. I landed at North Island with an uneventful trap on runway 36. Fortunately, the right engine surging with high-temperature indications did not get any worse.

Strangely enough, the fire crew did not detect excessive heat from either engine. After a thorough investigation, with both engines removed and treated for exceeding EGT limitations, we decided neither engine had had an overtemp. Extensive troubleshooting showed the upper thermocouple malfunctioned on the left engine, and the right engine was A799'd—could not duplicate on deck. Unfortunately, the ICEMS memory unit experienced a wrap-around condition, so it was useless in the troubleshooting effort. The mechs installed two new engines before the next flight, and, for safety reasons, we ordered the two removed engines not to be installed together on the same aircraft again.

No one got hurt, and an aircraft wasn't damaged, but one bad component was the difference between a perfectly good aircraft and one ready to be jettisoned. Knowing your aircraft systems, following procedures, and using good air-sense are tried-and-true actions to survive an emergency.

Cdr. Culbertson has flown as a T-2C SERGRAD flight-instructor pilot, as an operational FA-18 pilot, as an FA-18 and A-7E developmental test pilot, and as the chief flight instructor at the U.S. Naval Test Pilot School. He is now the director of quality and the chief pilot at Naval Air Depot, North Island, flying FA-18s coming out of overhaul, repair and modification.

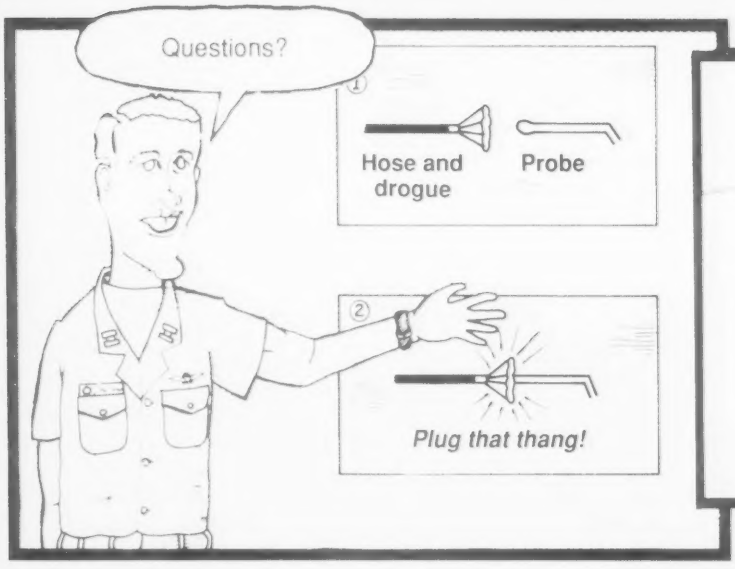
BROWNSHOES IN ACTION COMIX

"The kind real aviators like"

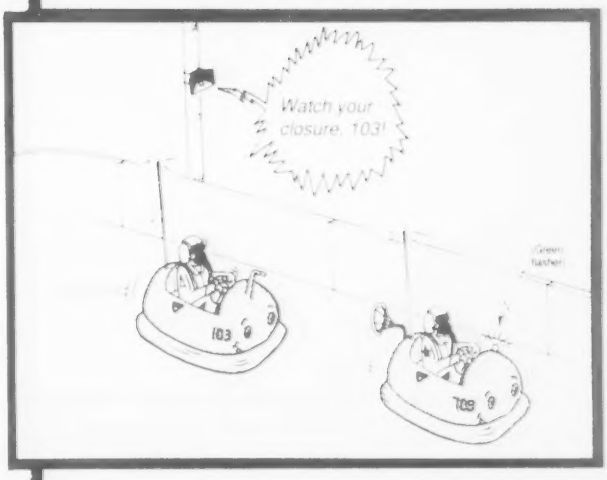
By Lt Ward Carroll

Syllabus in the Spotlight

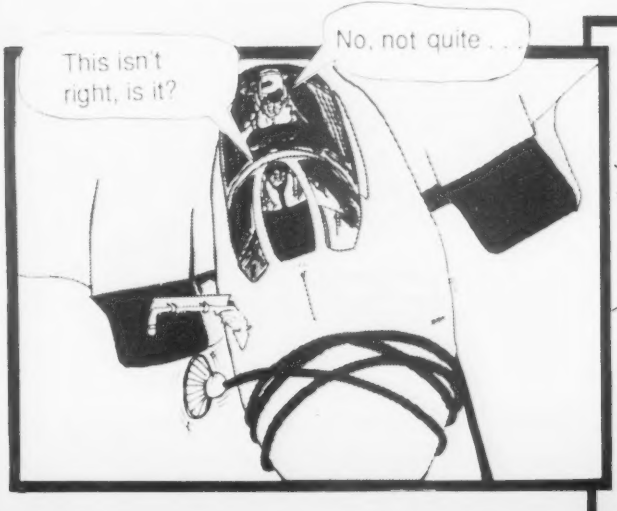
The initial in-flight refueling syllabus rivals carrier qualification for intensity. It begins with the classroom phase . . .



Next,crews move onto the dynamic trainer...



Then they try using the real McCoy . . .



Finally, the pilots' achievements are recognized before peers and relatives at the solemn "wearing of the baskets" ceremony . . .

Ready Room Gouge

Flight Takes More Than

Airspeed and Money...